

Short Communication

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A new record of complete albinism in the Five-striped palm squirrel (*Funambulus pennantii* Wroughton, 1905) from Madhya Pradesh, India

Arockianathan Samson^{1*}  and Hemant Bajpai² 

¹Bombay Natural History Society, Vulture Programme, Vulture Conservation Breeding Centre, Bhopal-462 044, Madhya Pradesh, India

²Bombay Natural History Society, Vulture Programme, Jatayu Conservation Breeding Centre, Pinjore, Haryana, India

*Corresponding author ✉: kingvulture1786@gmail.com

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Abstract

Albinism is a hereditary hypopigmentation disorder caused by recessive alleles that inhibit melanin production in the skin, fur, and eyes, resulting in either complete or partial loss of pigmentation. True albinism, typically characterized by white fur, pale skin, and pink eyes, is rare in wild mammals, with an estimated occurrence of about one in 10,000 births. On 12 October 2025, a completely white Five-striped palm squirrel (*Funambulus pennantii*) showing pink eyes, ears, and nose, confirming the diagnosis of true albinism, was recorded in Kurawar, Rajgarh District, Madhya Pradesh, India. This constitutes the first confirmed record of albinism in *F. pennantii* from Madhya Pradesh. The species is widely distributed across northern and central India and typically inhabits semi-urban areas, agricultural landscapes, and forest edges. Previous reports of color aberrations in *Funambulus* spp. from Maharashtra, Uttar Pradesh, Uttarakhand, Tamil Nadu, and Telangana primarily describe leucism rather than true albinism, making the present observation a significant addition to the limited documentation of pigment anomalies in Indian mammals. Records of albinism and related pigment disorders offer valuable insights into genetic variation, adaptive significance, and evolutionary processes—such as frequency-dependent selection that influence the persistence and ecological relevance of rare color morphs in natural populations.

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Albinism represents a group of hereditary hypopigmentation disorders transmitted through recessive alleles, leading to the absence or reduction of melanin in the eyes, skin, and hair (Mahabal et al., 2019; Samson et al., 2021a, b). The estimated frequency of true albinism in mammals is approximately one in 10,000 births, although this frequency may increase in small or inbred populations (Caro, 2008). Complete or true albinism is characterized by the total absence of melanin, producing white fur, pale skin, and pink eyes (Samson et al., 2021a, b), whereas partial albinism involves reduced pigmentation, termed leucism

(often confused with albinism), results in depigmented skin or fur but normal eye coloration (Samson et al., 2017; Cleamant Kiran Kumar et al., 2021; Thatikonda et al., 2023). In many cases, pigment disorders are associated with visual impairments and immunological deficiencies (Griscelli et al., 1978; Prusky et al., 2002). Due to their conspicuous coloration, albino individuals are generally more vulnerable to predation and may experience difficulties in foraging, camouflage, and mate selection (Uieda, 2000; Acevedo et al., 2009). Although albinism has been documented across multiple vertebrate taxa in India, including mammals,

birds, reptiles, and fish (Mahabal and Sanjay, 2014; Mahabal et al., 2015; Samson et al., 2016; Mahabal et al., 2019; Pathania et al., 2020; Samson et al., 2021a, b; Bawaskar, 2024; Saikia and Choudhury, 2025; Karthick et al., 2025), it remains exceptionally rare in wild populations.

The Five-striped palm squirrel (*Funambulus pennantii* Wroughton, 1905) is a diurnal and semi-arboreal rodent belonging to the family Sciuridae (Thorington and Hoffman, 2005). The species is distributed from eastern Iran through Afghanistan, Pakistan, northern India, and Nepal to Bangladesh, occurring from sea level up to 4,000 m above mean sea level (Molur et al., 2005). It inhabits a wide range of habitats, including tropical and subtropical dry deciduous forests, scrublands, grasslands, plantations, and urban environments (Nameer and Molur, 2016). The species is easily recognized by its slender body, long bushy tail, and five distinct white or whitish dorsal stripes. Body coloration typically ranges from grayish-brown to olive-brown, with three central pale stripes bordered by two lateral stripes. A key diagnostic feature is the absence of a mid-ventral line on the tail (Sayyed and Mahabal, 2016). In India, *Funambulus pennantii* is widely distributed across northern and central regions, extending to Nepal, Pakistan, Bangladesh, the Andaman and Nicobar Islands, and eastern Iran (Molur et al., 2005). Despite its abundance, reports of albinism or leucism in this species remain extremely limited.

On 12 October 2025 at 10:30 h, a completely white *F. pennantii* was observed alongside normally colored conspecific individuals at Kurawar (23.547425° N, 76.972803° E; elevation 487 m a.s.l.), Mugil Kedi, Rajgarh District, Madhya Pradesh, India (Fig. 1). The individual exhibited a pure white pelage, red eyes, and distinctly pinkish nose and feet, clearly indicating true albinism rather than leucism. The observation was documented on video for verification (https://jad.lu.ac.ir/article_736770.html). This represents the first confirmed record of complete albinism in *F. pennantii* from Madhya Pradesh, thereby broadening the known geographic occurrence of this rare phenotype within the species.

Species identification of the albinistic individual was based on biogeographic distribution patterns and its close association with conspecific individuals in the field, rather than coat coloration alone. Within Madhya Pradesh, *F. palmarum* exhibits a restricted and patchy distribution, primarily confined to the southern parts of the state, with confirmed records from Khajuraho and areas adjoining Satpura National Park. In contrast, the Five-striped palm squirrel (*F. pennantii*) dominates the northern and western regions of the state and represents the most commonly encountered palm squirrel in these landscapes.

The present observation originates from western Madhya Pradesh, well within the established distributional range of *F. pennantii*. Importantly, multiple normally colored Five-

striped palm squirrels were observed in close proximity to the albinistic individual during field surveys, indicating that the aberrant animal was part of a local breeding population. No individuals of *F. pennantii* were recorded from the study area during the observation period.

Based on (i) the well-documented regional distribution of *Funambulus* species in Madhya Pradesh and (ii) the repeated association of normally colored *F. pennantii* with the albinistic individual, we confidently identify the observed albino squirrel as *F. pennantii*.

In India, albinism has been documented in 34 mammalian species (Mahabal et al., 2019). Although rare, such records offer important insights into genetic variation and ecological adaptability in wild populations. The persistence of albino individuals poses significant evolutionary questions, particularly concerning predator-prey dynamics. Some studies suggest that albino animals experience higher predation rates due to increased visibility (Mueller, 1975; Sazima and Pombal, 1986; Smallwood, 1987), whereas others have reported no significant differences in predation pressure (Balgooeyen, 1971; Troncone and Silveira, 2001). These contrasting findings have been interpreted within the framework of frequency-dependent selection (Clarke, 1962). Under apostatic selection, predators may preferentially target common morphs, potentially conferring a survival advantage to rare phenotypes. Conversely, negative frequency-dependent selection favors common forms, thereby disadvantaging rare morphs such as albinos (Greenwood, 1985).



Figure 1: Albino Five-striped palm squirrel (*Funambulus pennantii*) recorded from Kurawar, Rajgarh District, Madhya Pradesh, India.

In the present case, several ecological factors may contribute to the persistence of the albino Five-striped palm squirrel recorded from Kurawar. The semi-urban, vegetation-rich landscape provides ample cover and food resources, potentially reducing exposure to predators. Additionally, a high diversity of sympatric prey species, including small mammals and birds, may further dilute selective predation pressure on the albino individual. Previous reports of color aberrations in the Five-striped palm squirrel are limited. Vipin et al. (2021) reported the first albino individual from Dehradun, Uttarakhand. Other studies have documented leucistic individuals from Satara District, Maharashtra (Sayyed and Mahabal, 2016), Ghazipur District, Uttar Pradesh (Yadav et al., 2019), and Dehradun, Uttarakhand (Kamalakaran et al., 2019). Comparable cases of leucism and abnormal coloration have also been reported in *F. palmarum* from the Nilgiris, Tamil Nadu, particularly in areas close to human settlements (Samson et al., 2017; Cleamant Kiran Kumar et al., 2021).

The observed prevalence of such anomalies in proximity to human settlements and semi-forested habitats suggests a potential link between habitat fragmentation, population isolation, and the heightened occurrence of pigment mutations (Holyoak, 1978; Bensch et al., 2000; Lopucki and Mróz, 2010; Ramakrishnan et al., 2016; Samson et al., 2017). These environmental conditions may facilitate genetic drift or inbreeding, thereby promoting the expression of recessive traits such as albinism. The current observation from Madhya Pradesh underscores both the genetic diversity within wild populations and the ecological stability of the region, which enables the persistence of individuals exhibiting rare phenotypes. The continued documentation and systematic reporting of such occurrences are essential for enhancing our understanding of genetic anomalies, population dynamics, and evolutionary processes in wild mammalian species (Samson et al., 2017; Samson et al., 2021a, b).

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Author contributions

Arockianathan Samson made the field observation, collected and analyzed the information, and prepared the manuscript. Hemant Bajpai reviewed the manuscript, contributed to interpretation of the observation, and provided editorial inputs. Both authors approved the final version of the manuscript.

Conflict of interest

The authors declare that there are no conflicting issues related to this short communication.

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